

Operations with Scientific Notation

Essential Question: How do you add, subtract, multiply, and divide using scientific notation?

Learning Goal: Students will be able to perform operations with numbers expressed in the scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology. **MAFS.8.EE.1.4**

Questions:	<div>Notes:</div> <div>Adding and Subtracting with Scientific Notation</div> <div>Numbers in scientific notation can be added and subtracted, either directly or by rewriting them in standard form.</div> <div>Example 1:</div> <div>The table below shows the population of the three largest countries in North America in 2011. Find the total population of these countries.</div> <div><table><tr><td>Country</td><td>United States</td><td>Canada</td><td>Mexico</td></tr><tr><td>Population</td><td>3.1×10^8</td><td>3.38×10^7</td><td>1.1×10^8</td></tr></table></div> <div>Method 1:</div> <div>Step 1: First, write each population with the same power of 10.</div> <div><table><tr><td>United States</td><td>3.1×10^8</td></tr><tr><td>Canada</td><td>3.38×10^7</td></tr><tr><td>Mexico</td><td>1.1×10^8</td></tr></table></div> <div>Step 2: Add the multipliers for each population.</div> <div>$3.1 + 0.388 + 1.1 = 4.538$</div> <div>Step 3: Write the final answer in scientific notation.</div> <div>4.538×10^8</div>	Country	United States	Canada	Mexico	Population	3.1×10^8	3.38×10^7	1.1×10^8	United States	3.1×10^8	Canada	3.38×10^7	Mexico	1.1×10^8
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Method 2:

Step 1: First, write each number in standard notation.

United States: 310,000,000

Canada: 33,800,000

Mexico: 110,000,000

Step 2: Find the sum of the numbers in standard notation.

$$310,000,000 + 33,800,000 + 110,000,000 = 453,800,000$$

Step 3: Write your answer in scientific notation.

$$4.538 \times 10^8$$

Multiplying and Dividing with Scientific Notation

Numbers in scientific notation can be multiplied and divided directly by using properties of exponents.

Multiplying Scientific Notation

$$(1.25 \times 10^4)(4 \times 10^4) = (1.25 \times 4) = 5 \times 10^{4+4} = 5 \times 10^8$$

Dividing Scientific Notation

$$\frac{4.5 \times 10^{28}}{3 \times 10^{15}} = 1.5 \times 10^{28-15} = 1.5 \times 10^{13}$$

	<p>Scientific Notation on a Calculator</p> <p>On many scientific calculators, you can enter numbers in scientific notation by using a function labeled “ee” or “EE”. Usually, the letter “E” takes the place of “x 10”. So, the number 4.1×10^9 would appear as 4.1E9 on the calculator.</p>
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